

**Amendments to the Drawings**

The attached sheet of drawings includes changes to Fig. 9. This sheet, which includes Figs. 8 and 9, replaces the original sheet including Figs. 8 and 9. In Figure 9, previously omitted element 32 has been added.

Attachments: Replacement Sheet

Annotated Sheet Showing Changes

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**Remarks**

The above Amendments and these Remarks are in reply to the Office Action mailed 02 May 2006. An appropriate Petition for Extension of Time to Respond is submitted herewith, together with the appropriate fee.

Claims 1-9 were pending in the application prior to the outstanding Office Action. In the Office Action, the Examiner rejected claims 1-9, and objected to claim 5. The present Response amends claim 3 and adds new claims 13-14, leaving for the Examiner's present consideration claims 1-9, 13 and 14. Reconsideration of the rejections is requested.

**I. OBJECTIONS****A. Objection to the Drawings**

The Examiner has objected to the drawings as failing to comply with 37 C.F.R. §1.84(p)(5) because they do not include the following reference sign mentioned in the description: "silica cores 32."

This has been corrected by adding the reference sign in Fig. 9. The designation was included in the informal drawings filed with the original PCT application but was accidentally omitted from the formal version of the drawings.

**B. Objections to the Disclosure**

The Examiner has objected to the specification because of several informalities. These are discussed in sequence below.

In paragraph 1.2(a) the Examiner points out that the disclosure indicates "a 1x2<sup>n</sup> splitter such as shown in Fig. 2" whereas Fig. 3 actually depicts a 1x2<sup>n</sup> splitter.

The specification has been corrected to refer to Fig. 3 instead of Fig. 2.

In paragraph 1.2(b) the Examiner states that element 31 is used to describe more than one element, an oxide layer and a lower silica-cladding layer.

The referenced language in the specification has now been changed to refer to the layer 31 only as an oxide layer, and that the optional lower silica cladding layer is not shown.

In paragraph 1.2(c) the Examiner states that the disclosure refers to a PLC chip as either element 18 or element 40 but it is unclear as to what figure number the disclosure is referring to when making reference to said PLC chip.

However, the PLC 18 in Fig. 5 may be different from the PLC 40 in Fig. 9. This can be seen by the indefinite article "a" used when introducing the PLC chip 40, in the PCT-published specification at page 7, line 29 ("a PLC chip 40"). The two PLC chips are therefore properly given a different reference numeral. 37 CFR 1.84(p)(4) does not apply because Figs. 5 and 9 are not different "views" of a single drawing.

Also, it does not appear that the disclosure ever does refer to "said PLC chip" at any point after the second PLC chip 40 is introduced. There is no "said PLC chip" language, to be unclear.

In paragraph 1.3 the Examiner objected to claim 5 on the ground that the term "substantially" is an ambiguous term and fails to define or limit the following term "symmetrical."

Applicants have now deleted the word "substantially" from claim 5. Applicants believe that this amendment does not narrow the claim at all, since as stated by the Examiner, the term "substantially" as initially used in claim 5 did not modify the following term "symmetrical" in any way.

In light of the above, Applicants respectfully submit that all the Objections have been overcome.

## II. REJECTIONS UNDER 35 USC 103(a)

The Examiner has rejected claims 1-8 under 35 U.S.C. §103(a) as being unpatentable over Bouda in US 6,643,432, in combination with Laurent-Lund in US 2005/0207705, and rejected claim 9 under 35 U.S.C. §103(a) as being unpatentable over a combination of Bouda, Laurent-Lund and Li US 5,745,619.

Applicants will discuss the independent claim followed by the dependent claims.

### A. Independent Claim 1

The Examiner rejected independent claim 1 as being obvious over a combination of Bouda and Laurent-Lund.

Claim 1 calls for a splitter in which, among other things,

a non-adiabatic tapered waveguide optically coupled between the input waveguide and the output waveguides; ... wherein

the non-adiabatic tapered waveguide merges substantially continuously with the input waveguide in a direction parallel to the optical axis of the input waveguide.

Bouda teaches a non-adiabatic tapered waveguide, but does not teach that it merge substantially continuously with the input waveguide. As shown in Bouda's Fig. 1, he has an abrupt transition from his input waveguide 1 to his tapered waveguide 3. Bouda promotes the abrupt transition for two reasons: (1) because he *does* want to generate higher order modes, thereby increasing the steepness of the field intensity profile at the edge regions on the output of his tapered waveguide 3 (Bouda, col. 5, lines 40-43, and col. 5, lines 53-55), and (2) because it increases the coupling efficiency between the input waveguide 1 and the tapered waveguide 3 (Bouda, col. 5, lines 50-53).

The Examiner recognizes this deficiency in Bouda, and cites Laurent-Lund to fill the gap. Specifically, the Examiner cites Laurent-Lund, Fig. 10 and paragraph [0081].

Laurent-Lund teaches the opposite of Bouda. He teaches a continuous merge with the input waveguide 2, but his tapered waveguide is *adiabatic*. Bouda promotes an *adiabatic* taper because he does *not* want to generate higher order modes. According to Laurent-Lund, the excitation of higher order modes will increase loss in the transition to the output waveguides. Laurent-Lund, paragraph [0081], last sentence, and paragraph [0059], last sentence.

Thus one of references cited by the Examiner has the goal of generating many higher order modes, whereas the other has the goal of generating no higher order modes. Neither reference has Applicants' concept of generating a controlled level of higher order modes, by a *continuous* transition from the input waveguide to a *non-adiabatic* tapered waveguide.

In fact, each of the two references teaches away from the combination proposed by the Examiner. Bouda says not to use a continuous transition because that would be contrary to his goal of generating higher order modes, and Laurent-Lund says not to use a non-adiabatic taper because that would be contrary to *his* goal of *avoiding* any higher modes.

At a minimum, it is apparent that to combine Laurent-Lund's continuous merge with Bouda's non-adiabatic taper would require Laurent-Lund to accept the excitation of higher order modes, a change in his method of operation that he explicitly disapproves of.

Accordingly, it is respectfully submitted that a person of ordinary skill would not have found it obvious to combine the two references cited by the Examiner, and therefore claim 1 should be patentable.

**B. Dependent Claims 2-9**

These claims all depend ultimately from independent claim 1 and therefore are believed to be patentable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each add their own limitations which, it is submitted, render them patentable in their own right.

Applicants have reviewed the grounds for rejection of these claims as stated by the Examiner and respectfully do not agree with the positions taken. Nevertheless Applicants do not believe it necessary to discuss their views on these claims further, since claim 1 is believed patentable as set forth above. Applicants respectfully reserve the right to present their further points regarding these claims should it become necessary in the future.

Accordingly, claims 2-9 are believed to be patentable.

**III. OTHER MATTERS****A. Other Corrections to Specification**

In addition to the amendments mentioned above, the specification has also been amended to correct two other typographical errors. No new matter is added since a person of ordinary skill would have recognized the existence of the errors and would have recognized the corrections made herein.

**B. New Claims**

New claims 13-14 are added to more particularly point out certain aspects of the invention.

**C. References Cited by the Examiner**

The references cited by the Examiner but not relied upon have been reviewed, but are not believed to render the claims unpatentable, either singly or in combination.

#### IV. CONCLUSION

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

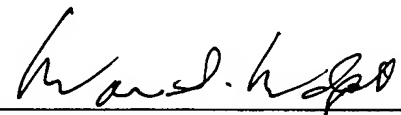
Enclosed is a PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136 for extending the time to respond up to and including 02 October 2006.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-0869 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: 29 September 2006

By:

  
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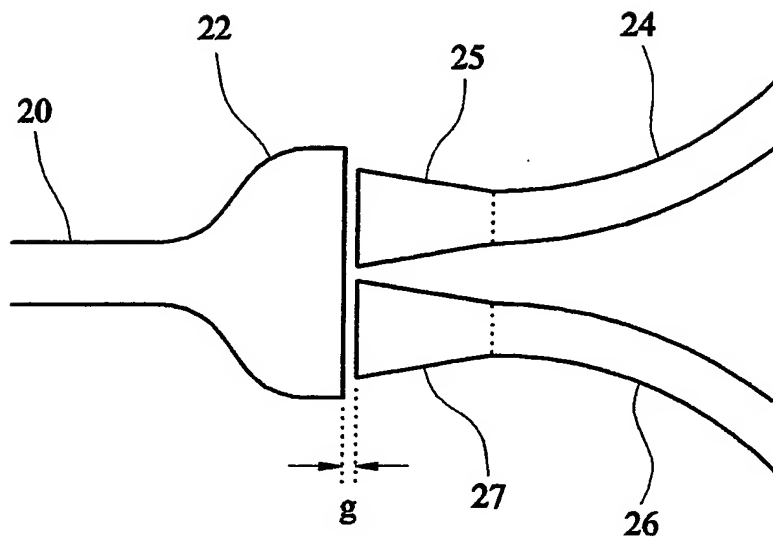


FIG. 8

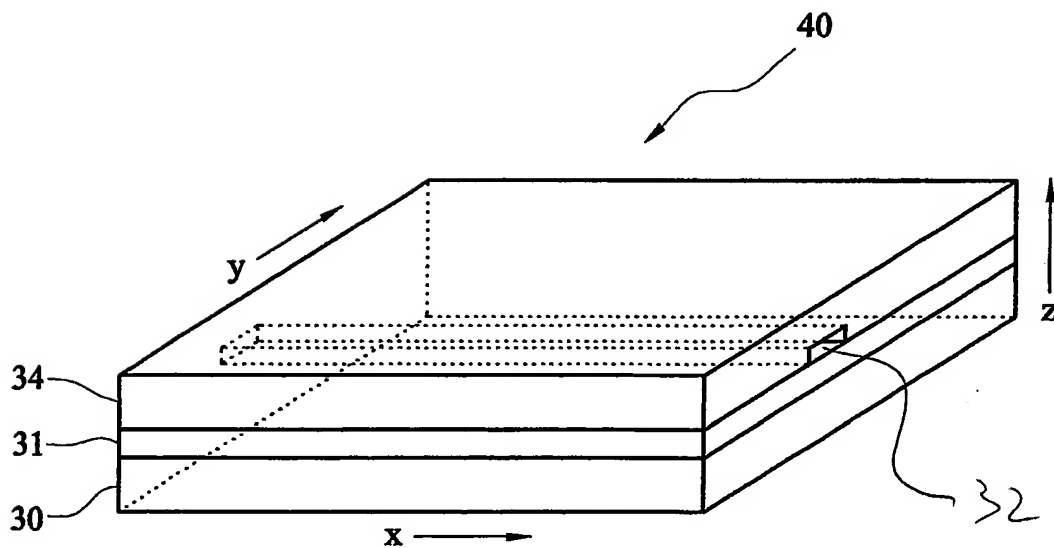


FIG. 9





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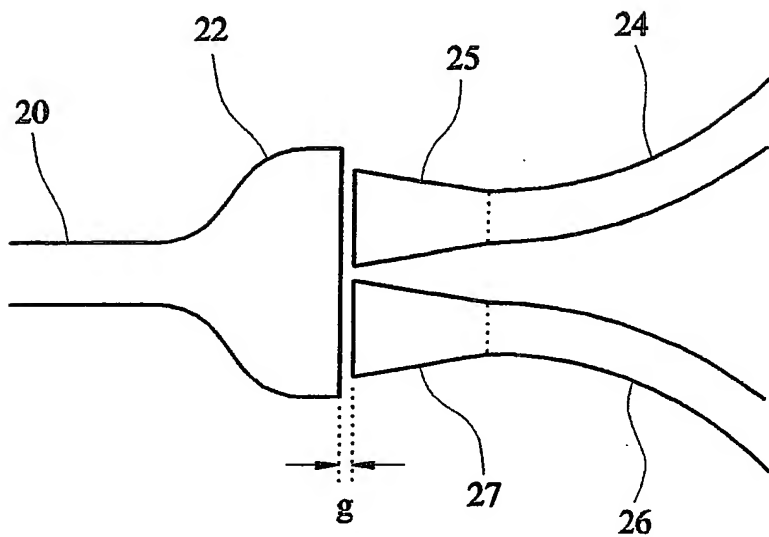


FIG. 8

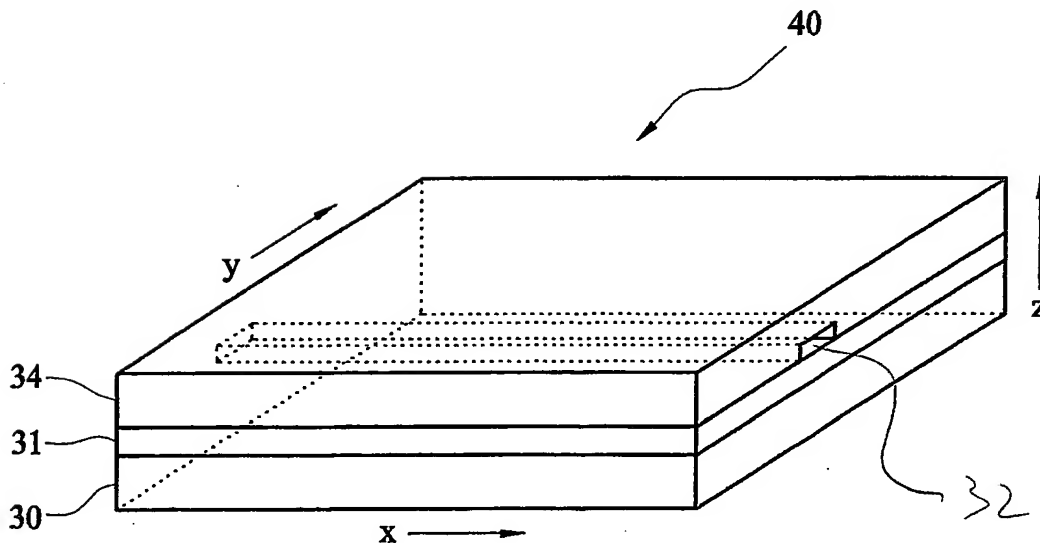


FIG. 9